PROBLEM BASED LEARNING

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ALSO IN THIS ISSUE: ASCO'S ANNUAL REPORT

Association of Schools and Colleges of Optometry

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DEPARTMENTS

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The **JOURNAL OF OPTOMETRIC EDUCATION** is published by the Association of Schools and Colleges of Optometry (ASCO). **Managing Editor**: Patricia Coe O'Rourke. **Art Director**: Dan Hildt, Graphics in General. Business and editorial offices are located at 6110 Executive Boulevard, Suite 514, Rockville, MD 20852 (301) 231-5944. **Subscriptions: JOE** is published quarterly and distributed at no charge to dues-paying members of ASCO. Individual subscriptions are available at $15.00 per year, $20.00 per year to foreign subscribers. Postage paid for a non-profit, tax-exempt organization at Rockville, MD.

EDITORIAL

The Curriculum Crunch

In recent years, schools and colleges of optometry have modified their curricula to accommodate optometry's expanded scope of practice. Now we face the problem of an overloaded optometric curriculum. The increased demand on our educational resources and our students has led to curriculum reviews both on the institutional and national level. These reviews have resulted in more precisely defined goals and objectives, but unfortunately, they have been expressed primarily in terms of the necessary knowledge base and have in large part ignored the issues of implementation and methodology.

Increasingly, educators involved in the health professions are calling for a shift in our educational emphasis. They stress that students should spend less time acquiring and retaining facts and more time developing analytical skills and the ability to be independent self-learners. The 1984 report of Project Panel on the General Professional Education of the Physician (GPEP), which was sponsored by the Association of American Medical Colleges, recommended that faculties limit the amount of factual knowledge conveyed in favor of an emphasis on essential skills, values and attitudes. To accomplish this, the GPEP report strongly recommended reducing lecture hours and increasing the time devoted to educational experiences that promote active learning and problem solving. ASCO's 1987 Strategic Plan also communicated these concerns by establishing "critical thinking" as a critical goal of the educational process in optometry.

Historically, optometry has depended upon the didactic method of teaching by talking. Currently, contact hours for our students, when considering both lectures and laboratories, may range from 25 to 35 hours per week. Students often attend a half a dozen lectures within a single day. Numerous studies have not only questioned the effectiveness of attending sequential lectures, but have demonstrated that little knowledge is retained after the first 20 minutes of a single lecture due to the passive nature of the learning situation.

In spite of all these concerns, many faculty react to the curriculum crunch by including more information within their allotted lecture time, rather than by exploring alternative teaching methods that could be more effective. The logic seems to be that since our students have less outside time to learn independently, we must convey all information within the scheduled teaching period. Of course this reasoning only aggravates the problem by relieving students of the responsibility to participate actively in their education.

Within the academic ranks of optometry there are a number of individual educators who have been seeking alternative methodologies and these efforts are to be applauded. Indeed, this is exemplified by an article included in this issue: "Problem Based Learning as a Potential Teaching Approach in Optometric Education: A Literature Review." This topic will also be explored by a symposium at the American Academy of Optometry meeting in New Orleans this December titled "Teaching Critical Thinking."

More global attempts at containing an expanding curriculum have been unsuccessful. This is partially due to entrenchment by faculties who equate reductions in teaching time with a weaker role for their field in optometric education or, on an individual level, as a threat to their job security. Rather than view reduced lecture hours as a threat, faculty must accept it as a challenge to define the goals of their curriculum area and to seek more effective methods for educating optometrists.

Administrators can facilitate this process by reviewing how faculty work load is defined. In education, workload frequently is defined by the number of lecture hours. This type of contact time-based calculation may be counterproductive. Approaches to education that reduce lecture time and stimulate independent learning may require as much or more work by the faculty than was required when more lecture hours were retained.

If the problem of the curriculum crunch is to be addressed seriously, with a greater emphasis placed upon critical thinking and self-learning, curriculum reviews must look not only at content but at methodology. Reviews must be comprehensive and must have the leadership of senior faculty and administration.

David A. Heath, O.D.
Editor

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SUSTAINING MEMBER NEWS

Sustaining Members support ASCO initiatives on behalf of the optometric education community. Sustaining members are listed on the inside front cover of each issue. Membership is open to manufacturers and distributors of ophthalmic equipment and supplies, and pharmaceutical companies.

Allergan Grant to ASCO and AOSA

Allergan, Inc. is providing an educational grant up to $63,000 to ASCO and the American Optometric Student Association for the review and update of the practice management curriculum and for the development of a series of practice management lectures for third and fourth year students of optometry.

Allergan will support the design and execution of a program in practice management for third- and fourth-year students which will provide an extensive resource manual for each student combined with a one-day interactive lecture program, together to be called "Pathways in Optometry." The "Pathways" program carries the support of the American Optometric Association.

Dr. Richard Hopping, the founding chairman of the AOA Professional Enhancement Program, has been designated to serve as the chief coordinator and consultant for AOA and Allergan in carrying out the "Pathways" program and the grant. Representatives from ASCO and AOSA will participate in the design and execution of the demonstration "Pathways" programs to be held at three college locations —Southern California College of Optometry, the University of Houston and the Pennsylvania College of Optometry—in the fall of 1989. Meetings will be held on each of the remaining campuses during the first half of 1990.

Members of the "Pathways in Optometry" Committee are Richard L. Hopping, O.D., chair, SCCO; Joanne S. Klopfer, O.D., M.P.H., PCO; Harris Nussenblatt, O.D., M.P.H., Houston; Peter Shaw-McMinn, O.D., SCCO; Phillip Gross, PCO; M. Bruce Neil, UMSL; Andrea B. Seeley, OSU; Jerome M. Joseph, Allergan; William E. Boyts, O.D., Allergan; and Jamie Trevor, Allergan.

Essilor Research Award-Winning Video Available for Viewing

The Essilor Research Award for original research in the area of presbyopia was recently presented to Michael Neider and Kathryn Crawford. The $10,000 prize was for the ongoing project that is being conducted in the Departments of Ophthalmology at Columbia University and the University of Wisconsin-Madison. Through the use of a video, taped in real time rather than frozen frames, the researchers detail the differences in accommodative mechanisms between old and young rhesus monkeys. A manuscript on ocular aging changes accompanies the video.

Varilux director of professional services Rodney L. Tahran, O.D., said that "The video shows something important about the whole presbyopia issue and the accommodative mechanism that has always been a great source of controversy. All through optometry school, I heard that either the lens hardens or the muscle that drives it quits working. Their video really shows three things that have not to our knowledge been demonstrated to this degree before."

Schools interested in viewing the videotape should contact Dr. Rodney Tahran or Danne Ventura at Varilux (1-800-BEST PAL).

Volk—Product Update

Volk Optical has developed the new Lid Lens Adapter for the Volk 90D lens.

The unique Volk Lid Lens Adapter quickly and easily fits into both the original 20 mm and the new 21.5 mm Volk 90D lenses, providing immediate aerial image observation as well as exact lens positioning, lens stability, and eye lid control, without contacting the cornea. No anesthetic is needed. The Lid Lens Adapter unit comfortably rests on the eye lids. The convenient friction fit provides for easy insertion and removal for 90D use with or without the Lid Lens Adapter.

The new 21.5 mm Volk 90D lens diameter provides a sweeping 63 degree field of view, and the "ideal" retaining ring diameter provides motility and ease of handling.

Our superior single element Volk 90D yellow lens avoids third and fourth surface reflections and ghost images inherent in add on filter systems. The patented Volk Double Aspheric optical design eliminates field curvature and astigmatism for clearest fundus imaging. Additionally, our special thin lens design minimizes chromatic aberration.

Available in both Clear and Volk Yellow *retina protector glass, the Volk 90D lens* features the highest efficiency and most durable, broad-band, multi-layer, anti-reflection coating available.

* * *

Volk has also introduced the 78D lens for Biomicroscopic Indirect Ophthalmoscopy (BIO) and the Volk 78D Lid Lens Adapter attachment.

The Volk Double Aspheric 78D 31mm lens has been specially designed for optimum magnification, optimum field of view, optimum working distance, and is perfectly sized for comfort and ease in handling.

The Volk 78D lens is available in both Clear and special Volk Yellow retina protector glass.

The patent pending Volk Lid Lens Adapter easily connects to and disconnects from the Volk 78D lens and is specially designed to help minimize lid movement and provide a simple and practical method of maintaining the lens stable and exactly distanced from the patient's eye. No topical anesthetic is needed. The Lid Lens Adapter unit comfortably rests on the patient's eyelid.

The Volk lenses and Volk Lid Lens Adapters are manufactured in the U.S.A. at Volk Optical, 7893 Enterprise Drive, Mentor, Ohio 44060. (216) 942-6161.

New Senior Vice President Named at CIBA Vision Corporation

James M. Callahan, president and chief executive officer of CIBA Vision Corporation announced that Terry Walts, vice president of new products, has been appointed senior vice president of sales and marketing.

Walts brings more than 18 years of marketing and strategic planning experience to his new position. He joined CIBA Vision Corporation as executive director of strategic planning in February of 1988 and had recently been named vice president of new products.

CIBA Vision Corporation, a subsidiary of CIBA-GEIGY Corporation, is based in Atlanta, Ga. A leading manufacturer of soft contact lenses and lens care systems, CIBA Vision Corporation markets a wide range of vision care products, including AOSEPT®, the lens care disinfection system most recommended by eye care practitioners, and the SOFTCOLORS® line of contact lenses.

In addition, CIBA Vision Corporation markets a variety of products for patients with special needs, such as toric lenses (for astigmatism) and bifocal lenses. CIBA Vision Corporation's products are available internationally.

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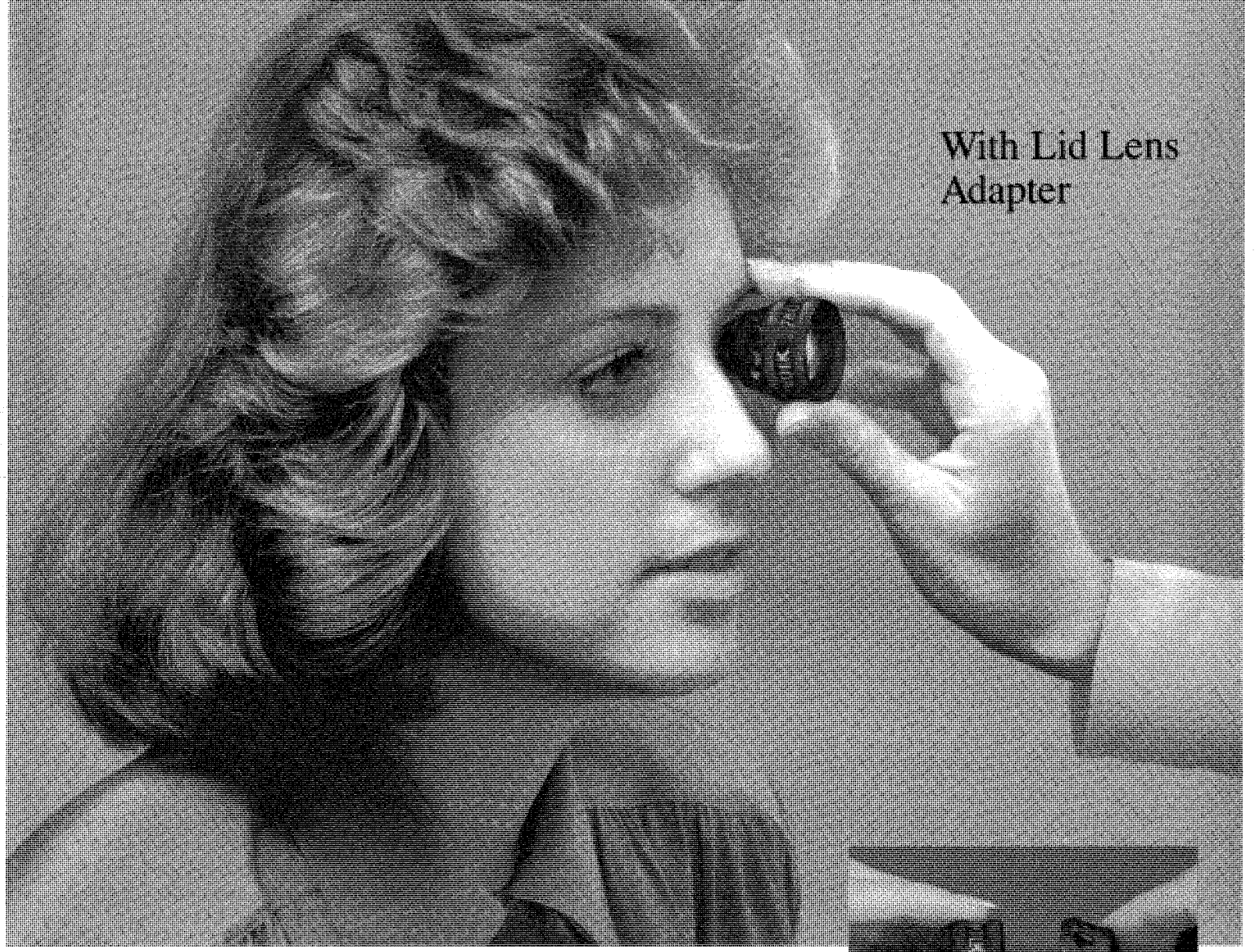

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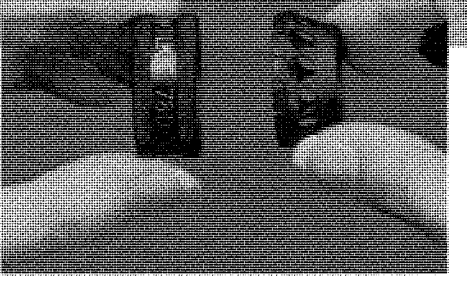
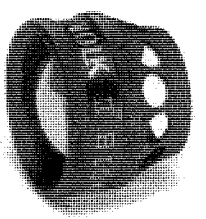


Simply insert the Volk Lid Lens Adapter into the lens retaining ring for improved lid control and lens stability during slit lamp indirect ophthalmoscopy.



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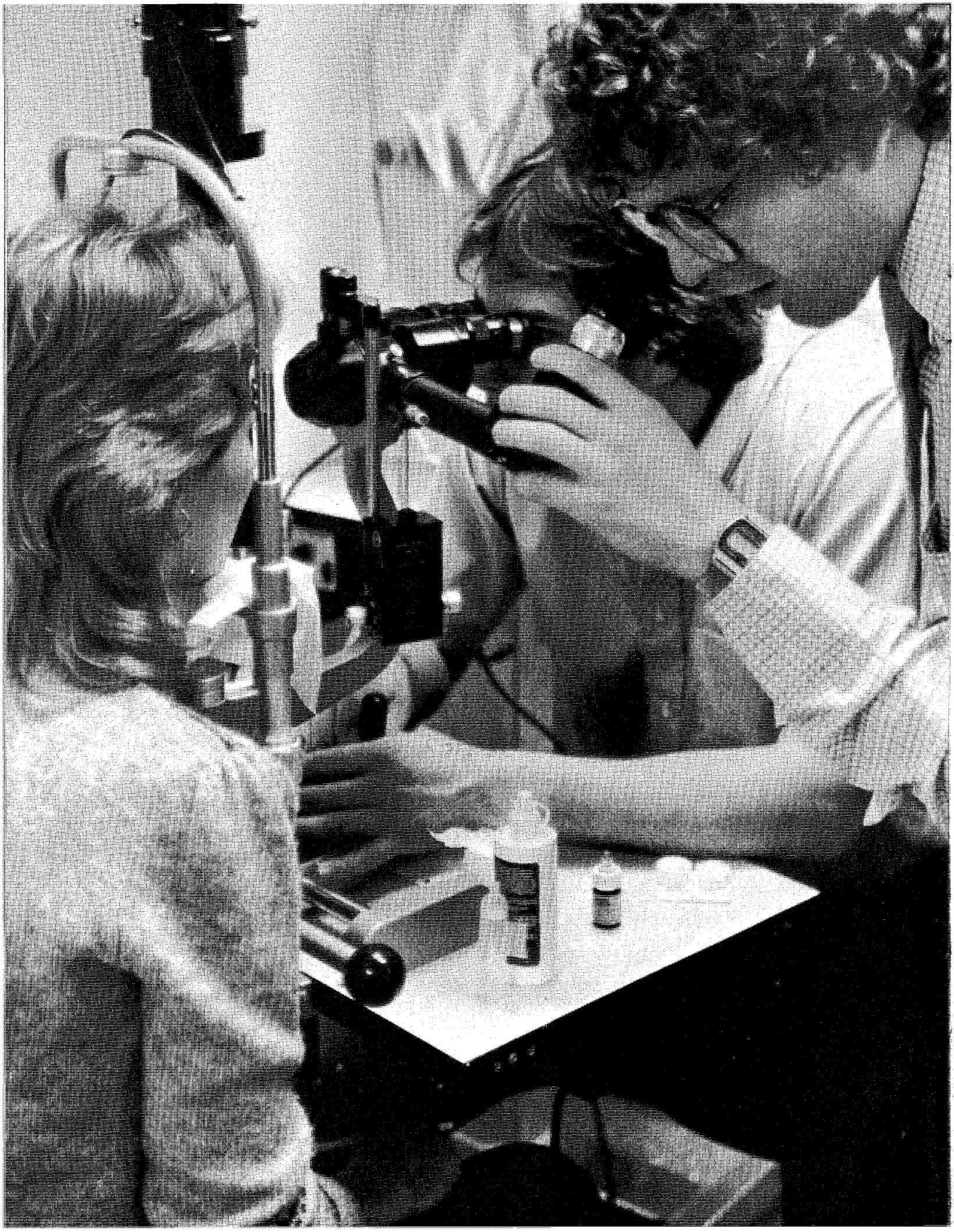


Problem Based Learning as a Potential Teaching Approach: A Literature Review

Mitchell Scheiman, O.D.
Steve Whittaker, Ph.D.
William Dell, O.D., M.PH.

Abstract

Optometry is a profession in which clinical problem solving in an atmosphere of an ever-changing and expanding knowledge and technical base is the foundation of everyday practice. Given this premise the ultimate objectives of optometric education should be to prepare our students to become adept at problem solving and lifelong independent learning.

This paper raises questions about the effectiveness of the traditional lecture based teaching approach in achieving these objectives, and explores the development of an innovative approach to teaching called problem based learning.

Key words: *Problem based learning, self-directed learning, patient simulation, clinical problem solving, optometric education.*

Introduction

The essence of optometric practice is clinical problem solving in an atmosphere of an ever-changing and expanding knowledge and technical base. The ultimate objectives of optometric education, therefore, should be to prepare our students to become adept at problem solving and to prepare them for a career of lifelong independent learning.

Drs. Scheiman, Whittaker and Dell are on the faculty at the Pennsylvania College of Optometry. Dr. Scheiman is associate professor and chief of the pediatric/binocular vision service, Dr. Whittaker is associate professor, and Dr. Dell is associate professor and assistant dean for curriculum.

The questions that must, therefore, be raised are:

1. Is the traditional lecture based, teacher-centered, teaching approach used by most, if not all, schools and colleges of optometry effective in achieving these goals?
2. If the current teaching approaches are not effective, what are the alternatives?

At the Pennsylvania College of Optometry we teach a series of courses entitled Normal and Abnormal Binocular Function. Using a traditional lecture format and team teaching, we integrate the presentation of clinical material with the basic sciences. Using this approach we have been disappointed with certain results of our teaching efforts. Many of our stated behavioral objectives directly involved the concept of a student being able to solve patient problems. Our testing revealed, however, that while students successfully memorized facts and principles, their ability to apply these facts and principles to clinical problems was less than adequate.

In an attempt to improve our ability to teach students to more effectively manage patients with amblyopia and strabismus while fostering independent learning capabilities, we decided to explore other teaching approaches. We found "problem based learning" to be a promising alternative.

The objectives of this paper are to review the historical development of problem based learning, to provide a general overview of the approach, and to outline the possible advantages of this teaching method over the more traditional lecture format.

Historical Background

The most common medical curriculum today is that referred to as "subject based teaching," in which basic sciences predominate initially, followed by clinical studies.[1] The delivery of this type of curriculum is for the most part through the traditional lecture format.[2] A review of the curricula at the schools and colleges of optometry in the United States and Canada reveals that a similar philosophy prevails in optometric education.[3]

Questions about the effectiveness of this teacher centered, lecture approach to prepare physicians for practice were reported as early as 1962.[4-8] Both Miller[4] and West[5] have criticized the traditional educational approach. Miller had medical students retake basic first year examinations which they had previously passed. He found that regardless of whether the students were then in their 2nd, 3rd, or 4th year, or whether they came from the upper or lower quarter of the class, none could pass the retake. West[5] suggested that students are overtaught, and that the less teachers teach, the more students learn. It is West's contention that while most teachers understand the importance of developing a student's capacity for critical thinking and self-education, most of us are too busy telling them ***what*** we know to get around to telling them ***how*** we learn.

Doran[6] suggests that students might gain more from watching us learn than from watching us teach. Barrows and Abrahamson[7] reported that students in their courses in neuroanatomy, neurophysiology and clinical neurology "seemed to have a paucity of basic

knowledge that they could apply to the patient problem."[8]

The shortcomings of the traditional lecture format, according to its critics, can be summarized as follows:

- A significant decline in student attention occurs after about 15-20 minutes.[9]
- A significant amount of information given in a lecture is neither perceived nor absorbed.[10]
- Relatively little information that students memorize for tests can be recalled later.[5,11]
- The little information that can be remembered may not be recalled when it is needed in the context of clinical care.[12] The lecture does not lead to ability to apply information to clinical problems. The student is expected to memorize principles and facts and to repeat them for examinations. Seldom is the student asked or required to apply the information to clinical problem solving tasks.
- The lecture is a passive approach which is teacher centered, meaning that the teacher is solely responsible for what the student is expected to learn. The teacher decides what information the student should learn, how it is to be learned, in what sequence, and at what pace.[8,9]
- There is generally little and delayed feedback to the lecturer about student understanding and progress.[13]
- Subject based learning does not encourage self-directed learning. Students, therefore, may be left without the tools with which to learn the rest of their professional career as new concepts, skills, and techniques develop.

Barrows summarizes the weaknesses of the lecture approach as follows: "Medical school faculties want problem solving, independent, critical thinking practitioners, yet they prepare them by asking them to memorize passively large amounts of information in irrelevant contexts, using low order cognitive skills. The students are, for the most part, spoon fed, passive learners . . . dependent on the teachers to provide information in lectures and reading assignments, and students never learn to acquire effective or efficient self-directed educational skills."[13]

The perceived weakness of conventional medical education has led to the development of alternative methods of teaching, including an approach referred to as problem based learning. Several of the earliest reports on the use of problem based learning in medical education were in the late 1950s and early 1960s by Rimoldi[15,16] and Barrows.[7] They described methods of simulating patient problems which could be used in medical education to evaluate and train students. Rimoldi[15] described a method of simulating a patient using a deck of cards. Each action a physician might typically take with a patient is written on the front of a card. The outcome or result of the action selected is printed on the back of the card. For example, an interview question such as "what is bothering you today" could be on the front of card number one. The back of this card, representing the outcome, might read "I have been experiencing dizzy spells the last two weeks." Based on this response, the student would continue to select cards representing actions he/she would typically take when examining a patient.

Barrows and Abrahamson[7] described the use of actors to simulate a patient problem. According to Barrows the simulated patient "is a living, breathing, reacting human who has been trained to accurately recreate the history, personality, emotional structure, responses, and physical findings of an actual patient."[17] This actor or simulated patient can be examined by students under very controlled conditions increasing the effectiveness of the encounter.

". . . Experienced clinicians are challenged by about 5% of the cases they encounter. In the other 95%, the correct diagnosis is reached by comparing the current situation with previous remembered cases."

Since these early studies other methods of presenting patient problems have been reported. These include patient management problems (PMP),[18-20] two dimensional patient management problems,[21] sequential management problems (SMP),[22] the diagnostic management problem (DMP),[23] the portable patient problem pack (P4),[24,25] the problem based learning module (PBLM),[26] and computer simulations.[27-32]

In 1969 McMaster University in Hamilton, Ontario, inaugurated a new Medical School program which at the time was considered a radical innovation in medical education.[2,33-35] The founders of the program believed that the lecture was not the most satisfactory means of providing a contemporary learning environment and its use could be avoided or significantly reduced.[2] They also felt that basic sciences did not have to precede clinical studies. As an alternative they developed an educational program in which clinical problems were presented on the very first day of the program. They referred to this approach as "problem based" rather than "subject based."[2]

Since 1969, approximately twelve new medical schools have adopted problem based learning curricula similar to that of McMaster University, and educators in established schools have shown an interest in this approach.[2]

In 1981[36] an editorial appeared in a medical journal entitled "Medical Education" suggesting that educators have an obligation to find better ways to prepare their students for the tasks they will have to perform later as physicians, stressing that "almost all of the learning a doctor will need to accomplish in his forty or more years of professional work, after his formal education, will be his own responsibility."[36] The author implied that the conventional lecture format is inadequate to achieve this objective and that there is little relationship between the retention of facts and clinical competence. Instead, he advocated the use of problem based learning as an alternative teaching approach.

In a report published in 1984 by the Association of American Medical Colleges entitled "Physicians for the Twenty-First Century," a series of conclusions and recommendations were made about the future of medical education.[37] One of these conclusions was the following:

"To keep abreast of new scientific information and new technology, physicians continually need to acquire new knowledge and learn new skills. Therefore, a general professional education should prepare medical students to learn throughout their lives rather than simply to master current information and techniques. Active, independent, self-directed learning requires among other qualities the ability to identify, formulate, and solve problems; grasp and use basic concepts and principles; and to gather and assess data rigorously and critically." Two of the recommendations which were made to deal with this conclusion are:

- Medical schools should provide educational experiences that require students

to be active, independent learners and problem solvers, rather than passive recipients of information.

- Medical schools should critically examine the number of lecture hours they now schedule and consider major reductions in this passive form of learning.

Thus, in recent years there has been movement in medical education away from the traditional lecture format to the problem based learning approach. This change in philosophy has occurred at every level of the medical education system. Advocates include individual medical educators and researchers, medical schools, and national medical organizations.

While support for the concept of problem based, self-directed learning has grown over the last two decades, it is important to remember that the vast majority of medical schools have chosen not to make any significant changes in teaching methods. An editorial in "Medical Education" in 1979, referring to problem based learning, is an example of the argument of the traditionalists: "Despite indications of its good educational potential and vigorous advocacy by its protagonists, medical teachers remain uncertain about its usefulness."[38] Skeptics point to a lack of research to support the claim that problem based learning is a more effective teaching approach. Many are concerned that the transition from traditional to problem based learning will produce a major organizational upheaval and will require radical changes in teaching method by the faculty.

Problem Based Learning: Description, and Principles

Problem based learning is an instructional method designed to allow the student to use a particular problem as a focus for the study of a variety of subjects. In contrast to traditional education in which facts and principles are presented first, clinical problems are presented first in problem based learning. In the process of solving these problems, students learn facts and principles. The advantages of problem based learning include the following:

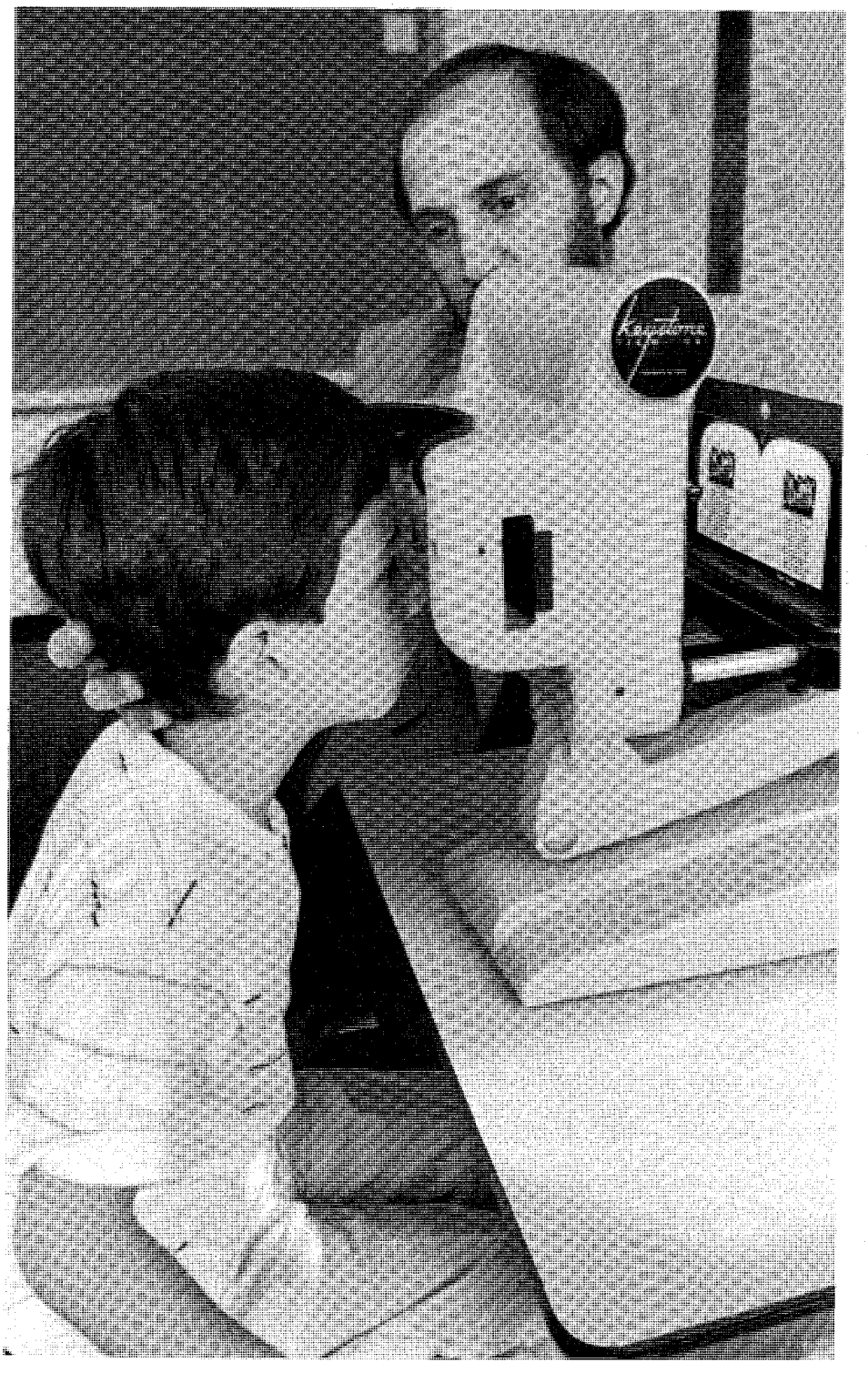
- Information and concepts are learned in association with problems.
- The student is required to develop problem solving, diagnostic, and clinical reasoning skills.
- The relevance of basic science to real problems becomes more apparent.

The purported efficacy of problem based learning rests on two assumptions. First, learning through problem solving is much more effective for creating a body of usable knowledge than traditional memory-based learning. The second is that the skills most important for health care practitioners are problem solving skills, not memory skills.

Example of a Problem Based Learning Curriculum

In his textbook, "Implementing Problem Based Medical Education," Kaufman[39] describes in detail the problem based curriculum at the University of New Mexico School of Medicine. The four year New Mexico program is divided into three phases. Phases I and II occupy the first two years of the curriculum and are essentially the preclinical years, while Phase III takes place over the last two years and involves clinical care in hospitals and community based clinics as well as some elective courses.

During the first six months of the first year, students work in tutorial groups of five students and one faculty facilitator, meeting for a half day session three times per week. The group also meets once



each week for a clinical skills session in which the students learn the skills and scientific basis for routine history and physical examination. This is the only formally scheduled time for the students and there are no lectures. A large part of the student's time, therefore, is spent in independent study, pursuing learning issues either derived from tutorial sessions or self-generated. Some time also is spent interacting with faculty members who act as resources for learning.

During the half-day sessions the groups meet with their tutor and a simulated patient problem is presented. The specific clinical problems simulated are carefully designed to introduce the techniques of problem based learning and to provide a survey of the major concepts in each of the basic science disciplines. An example of a typical simulated problem which is presented in the *first week* of New Mexico's program is the following:

"Zebulon Kincaid is a 66-year-old married man, retired from work as a 'roughneck' in the oil fields. He is a 60-pack-per-year smoker living on a marginal income. After wining and dining a woman he picked up at a bar, he began sexual foreplay but could not sustain an erection. He then experienced a sudden onset of crushing, substernal chest pain."

It is important to remember that this is the very first learning experience for the students in the medical program. They are faced with this particular patient problem and the only knowledge they have is that which they bring from previous experiences.

Before approaching the problem, the group decides upon objectives. In the preclinical years, the objectives would be aimed at identifying the mechanisms or dynamics that are involved in patient problems at a molecular, anatomical, biochemical, or physiological level. Later in the curriculum the emphasis is placed upon diagnosis and treatment of the patient's problems.

The tutor or facilitator will generally begin a session by asking a student to make a list of the patient's problems. Students may need to define terms and refer to textbooks, which are readily available in the rooms. After generating a problem list, students are asked to develop broad hypotheses to explain the problems, stressing underlying mechanisms rather than specific diseases. Table 1 is an example of a typical outcome for this case.

Confronting a real problem prior to formal study allows the students to see clearly what they do not know and what they have to learn. This serves several purposes. It provides motivation and relevance for learning. People generally read with far more interest and retention when study is relevant to a problem they have already attempted to solve.[46]

After listing the problems and possible hypotheses the students list learning issues that need to be studied before the next meeting. Some of these issues are to be researched as a group and some individually. Table 2 provides an example of learning issues which might be developed by a group of students working with this problem.

After the first session students spend most of their time studying independently in the library, consulting resources, and reviewing issues with the group. They return later in the week with new information and attack the problem once again. Armed with this additional information they begin working on the problem from the beginning and may revise their approach, hypotheses, and choice of underlying mechanisms. The students are, therefore, not only learning information but actively using the information in the analysis of a patient problem.

When the students are at a more advanced level, this problem could be approached with the objectives of reaching a diagnosis and treatment plan. Thus, the emphasis would be on hypotheses, inquiry strategy, data analysis, problem synthesis, and clinical management.

Books by Barrows,[8,40] Kaufman[39] and Schmidt[41] provide extensive descriptions of other examples and detailed accounts of how to implement problem based learning.

TABLE 1

Typical Outcome for Case Presentation One

Problems	Hypothesized Causes
Crushing chest pain	heart attack indigestion anxiety muscle strain
Inability to maintain erection	psychological something wrong with the normal mechanisms (neural? vascular?)
Smoking	peer pressure advertising addiction

TABLE 2

Example of Learning Issues for Case Presentation One

Major Learning Issues for Group	Learning Issues More Appropriate for Individual Learning
What is a heart attack?	What is the gross anatomy of the heart?
What causes pain in a heart attack?	What are the risk factors for heart disease?
Does it make a difference which heart wall is injured?	How does the nervous system sense pain?
What structures under the sternum might be a source of pain?	What causes impotence?
Which of the known risk factors for heart attack apply in this case?	What is the relationship between stress and heart attacks?
	What causes indigestion?
What are SGOT, LDH, and CPK and why are they elevated in a heart attack?	How does normal cardiac electrical conduction work?

Important Characteristics of Problem Based Learning

Problem based learning is a broad term and does not refer to any specific educational method. It must by definition, however, involve the use of a problem as a stimulus for learning. To be most effective it is desirable for the problem based learning format to have the following characteristics:

- The problem should be presented in a format that will help the student develop clinical reasoning skills.
- The problem should stimulate appropriate self-directed learning.[8]
- The problem should have high fidelity, i.e., the process of solving the simulated problem should be as close as possible to working with a "real patient."

Format Should Help the Student Develop Clinical Reasoning Skills

According to some authors,[8,42,43] a general hypothetico-deductive method for problem solving is shared by all clinicians. This problem solving process has been called the "clinical reasoning process" or "medical problem solving." These terms refer to "the cognitive process that is necessary to evaluate and manage a patient's problems."[8]

Barrows and Tamblyn[8] developed a five-step model of the clinical reasoning process. They believe that five steps occur sequentially in any patient encounter. These are:

1. **Initial Concept Formation**—The initial concept is generated from the clinician's perception of the patient and the setting in which the patient is encountered. These perceptions can be observations about appearance, affect, age, dress, or other behavior. Other cues can come from referral letters, previous records, or a discussion with the parents of the patient. These cues are gathered almost instantaneously and represent an initial concept about the patient. An example with an optometric patient might be: "a very active five-year-old child who is squinting frequently and who probably will not give good subjective responses."

2. **Hypothesis Generation**—Very early in the patient encounter, the examiner generates approximately 2-5 hypotheses as possible explanations for the patient's problem. These hypotheses are based upon the clinician's past experience and knowledge. These hypotheses which may be very general initially, such as "an accommodative convergence problem," or "refractive error," become more specific as the examination or educational program progresses.

3. **Search and Scan Activity**—After several hypotheses, the clinician searches for data through examination, laboratory testing or consultation for evidence that can be used to confirm or reject early hypotheses—a process referred to as "searching." "Scanning" describes the activity used to look for information which may indicate an overlooked problem, to fill in background information, and to increase confidence that nothing was overlooked.

4. **Problem Formulation**—As data is gathered, a formulation of the patient's problem evolves which is based upon the information gathered to that moment. If one interrupts an experienced clinician during an evaluation and asks him/her about the patient's problem, he/she will be able to verbalize a fairly concise description.

"The format should allow the student to follow the consequences of his/her decisions or actions with the patient and allow for observations about the patient's appearance and results of examination procedures."

5. **Closure**—This occurs when the clinician feels that he/she has all the information necessary to manage the patient's problem.

Although the above model proposed by Barrows and Tamblyn intuitively makes sense, several authors have questioned whether such a clear cut "clinical reasoning process" exists for clinicians.[44-48] Norman[48] suggests that the majority of problems in clinical medicine are solved through mental strategies that do not fit into the model proposed by Barrows. He raises two important concerns about the "general skill of problem solving." First, Neufeld[44] found that first year medical students use exactly the same process as trained physicians. If problem solving is a learned skill, it is, therefore, not acquired in medical school. Rather, the main difference between expert clinicians and students is not in the process itself but in the better hypotheses generated by experts. Second, if problem solving were a general skill, we would expect that it would be relatively independent of knowledge. Norman[48] studied the relationship between knowledge and problem solving ability and found that problem solving ability is heavily influenced by knowledge. In his study, clinicians who had a stronger knowledge base were better problem solvers.

In his paper, Norman tries to differentiate problem solving skills from the ability to solve problems. Everyone would agree that expert clinicians solve problems with great efficiency and accuracy. If the problem is solved how can one claim the individual is not using problem solving skills? According to Norman, experienced clinicians are challenged (i.e., must engage in problem solving) by about 5% of the cases they encounter. In the other 95%, the correct diagnosis is reached by comparing the current situation with previous remembered cases. This approach can be likened to a "Gestalt," a perception of a form that is based on limited sensory information. From experience the clinician is able to perceive or abstract patterns from the clinical data well before the data could be organized using the hypothetico-deductive approach.

Although Norman questions the validity of Barrow's concept of problem solving, he is still a strong advocate of problem based learning. He believes the primary advantage of problem based learning is not to teach problem solving skills, but to enable the student to acquire knowledge in the context of clinical problems. The task of any clinician is to apply knowledge and skills to the solution of a patient's problem. Thus, it makes sense to learn the prerequisite knowledge in the same context—in the context of the patient problem.

The Problem Should Stimulate Self-Directed Learning

The information acquired in the four year curriculum in any optometry school represents only a percentage of the information that an optometrist will eventually acquire through a professional career. Moreover, most of the information a primary care optometrist needs could be stored on a CD-Rom disk and be readily accessible by a personal computer. Skills of self-assessment and self-directed learning allow students to become sensitive to personal learning needs, and locate and

use appropriate information resources.[49] These are essential skills for optometrists as the profession continues to expand and our research literature grows.

Barrows[51] stresses the importance of self-directed learning for the acquisition of a solid foundation of biomedical science information in a manner that is useful for clinical problem solving. He argues that it is helpful for students to realize on their own that they need to know information from the biomedical sciences to understand a patient problem. This process may be more movivating than a teacher telling students that they must learn that information and it will be important some day.

Self-directed learning also may be beneficial since it frees students to learn in ways which suit them personally and allows them to learn at their own individual pace.[8,52] Finally, with tangible goals and less overt pressure, learning becomes an enjoyable, and engaging experience.

The Patient Problem Should Simulate the Real Clinical Situation as Closely as Possible

There is little doubt that optometry students are highly motivated to work with real patients in a clinical setting. The problem based learning approach recognizes that patient simulations are no substitute for the real patient. The student should always have the opportunity to work as much as possible with real patients. However, actual interaction with patients may not always be the ideal method for a student to acquire knowledge and clinical skills. Some disadvantages of working with real patients are:[8]

1. The appropriate patient for student learning may not always be available at a particular time.
2. The available patient may present with complexities or unrelated problems that can distract or confuse the learner.
3. The student may lose contact with the patient if several follow up visits are necessary.
4. Unless the student is relatively skilled and experienced, the patient may feel that he/she is being used as a "guinea pig" in the student's education.
5. The student may be distracted by his/her neophyte status in front of the patient, especially if he/she is insecure in clinical assessment.
6. The patient may become upset or anxious when the student and teacher discuss the case in the patient's presence.
7. The patient may be put at risk (e.g. emergency situation).

As an alternative to real patients, optometric educators have traditionally used written case studies containing history, examination findings, diagnostic test results, and consultants' reports. This format is used in lectures, course notes and textbooks. However, this approach is so unlike the encounter with a real patient that it has limited value. Some of the problems associated with this approach are:[8]

1. The format is unreal and abstract. There is no challenge to the skills of interview and examination.
2. The student is not challenged to develop an initial concept or to generate early hypotheses because all the important data are provided.
3. A basic truism about patient problems as they present to a clinician is that "all the important information needed to solve problems is typically unavailable."[39] In written case studies it is all available.

"Problem based learning has become a viable, and respected, alternative to the traditional subject based, lecture approach in medical education."

An alternative to working with real patients and the traditional case study is the use of patient simulations. Barrows[8] believes that the simulation should be as close as possible to the real situation in order to benefit as much as possible from the advantages of real patients. Many formats for simulating patients have been developed.[7,15-32] These include the use of live actors, written simulations, and computer simulations. In a subsequent paper we will describe both a written simulation and a computer simulation we have developed for use in optometric education.

In a simulation there is first a presentation of the initial setting and complaint. The student should be able to select any action he/she would take in the actual clinical setting and in any order permissible in the normal clinical environment. The format should allow the student to follow the consequences of his/her decisions or actions with the patient and allow for observations about the patient's appearance and results of examination procedures.

Methods of Implementation of Problem Based Learning

Purists[49] believe that if a school adopts the problem based learning method it should ideally be an "all or nothing" approach. Barrows[49] feels that for a curriculum to combine courses using the traditional lecture format with problem based learning leads to enormous difficulties. In such a double system there are contrasting demands placed upon the students. They are expected to spend considerable time with self-directed learning, yet they must also attend traditional lectures. Problem based learning, in its pure form, requires significant amounts of unscheduled time.

Others disagree and recognize that however desirable it may be to change to a problem based system, it is difficult, if not impossible, to make such a dramatic change all at once in an established curriculum. Several authors have described "hybrid" or dual systems which could be implemented in traditional curricula.[39,41,52,53] These include curricula in which both lectures and problem based learning are scheduled,[39] problem based learning for large groups[25,52] and "case based learning days" which can be used as a first exposure to problem based learning in a traditional curriculum.[53]

At the University of New Mexico,[39] for example, the faculty experienced significant difficulty implementing a "pure" problem based learning approach in certain subjects. Their gross anatomy course is now taught in a more traditional fashion. Courses like anatomy, which rely heavily on laboratory experiences, can be a logistic nightmare in a "pure" problem based approach.

There also appears to be room for some emphasis on problems other than clinical problems. Research problems, for example, can be used to engage students in more basic questions regarding the foundations of clinical practice. Finally, there are some teachers who teach very effectively using traditional lecture or large group discussion styles. Ideally, a curriculum needs to accommodate varying logistic and fiscal constraints, different learning styles of students, as well as different teaching styles of faculty.

Summary

The objectives of this paper were to review the historical development of problem based learning, provide a general overview of the approach, outline its advantages, and in the process stimulate the interest of optometric educators in this teaching method.

Problem based learning has become a viable, and respected, alternative to the traditional subject based, lecture approach in medical education. Many of the well-recognized shortcomings of conventional medical education have been overcome using the problem based format.

Because optometric education shares many of the characteristics of medical education, problem based learning would appear to be a teaching format that should be seriously considered by optometric educators. Optometry must be as concerned as the medical profession has been about "information overload."[54] As optometry continues to develop as a profession, the information which students must learn continues to expand. Currently, for example, many of our institutions are struggling with the need to add additional courses in the basic sciences and clinical areas to train our students in the treatment of eye disease. The natural reaction of educators is to attempt to pack more and more information into courses and lectures. Unfortunately, there is often little concern for the student's capacity to absorb, understand, retain, and use the information in subsequent clinical work.[50] Students may reach the point where they feel that "I have so much to remember, I have no time to learn."[54] Today, with the advent of computer based information retrieval, memorization of facts is becoming even less important.

Most optometric educators would readily agree that an important objective of the curriculum is to produce practitioners highly skilled at solving patient problems and capable of continuing to expand and update their knowledge and skills to keep up with changes in the profession. Effective teaching of these skills has been a problem using traditional teaching methods. Problem based learning may represent an important part of the solution. □

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Effects of Changing Student Characteristics on Attrition at the New England College of Optometry

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Abstract

Four classes entering The New England College of Optometry at five year intervals were studied to explore the relationship among gender, Scholastic Aptitude Test results and attrition. The study incorporated a method of log-linear modeling to investigate the main and interactive effects of the selected variables. No meaningful interaction was found to exist between gender and the other treated variables. However, lower Scholastic Aptitude Test levels were found to be significantly associated with higher attrition levels.

Key words: *attrition rates, SAT levels, gender composition, log-linear models*

Introduction

Since the early 1960s, optometry schools have experienced a number of demographic shifts among entering students. Notable among these trends are a gradual but consistent increase in the mean student age, a substantial increase in the number of women and a moderate increase in numbers of minorities.[1,2,3,4] It has been the authors' observation that some schools also have observed a decline in student aptitude as measured by entrance examinations and/or high school Scholastic Aptitude Test scores. This paper reports on the findings of our study of the relationship between a rise in attrition rates, gender composition and the decline in SAT scores. The study was conducted at the New England College of Optometry (NEWENCO).

The number of women students at NEWENCO has increased steadily for almost two decades. In 1972, 17% of the entering class were women; in 1987, 68% were women. This strong upward trend is similar to national enrollment data. In 1971, women represented 3.6% of optometric enrollment in the United States; by 1987, 39.3% of the entering classes were women.[5] Indeed, this steady increase in both numbers and percentage of women enrolling and graduating from optometry schools correlates with trends in other health professions. In medical education the percentage of women students increased from 13.7% in 1971 to 30.7% in 1983.[2] Other professions demonstrate an even greater change. The enrollment of women in pharmacy schools in 1984-85 was 54.5%.[2]

Another consistent trend in the NEWENCO applicant data has been a downward slope in Scholastic Aptitude Test scores. The mean combined applicant SAT scores at NEWENCO dropped 16% between 1972 and 1987. This reduction was consistent across both the verbal and mathematics sections of the Scholastic Aptitude Tests.

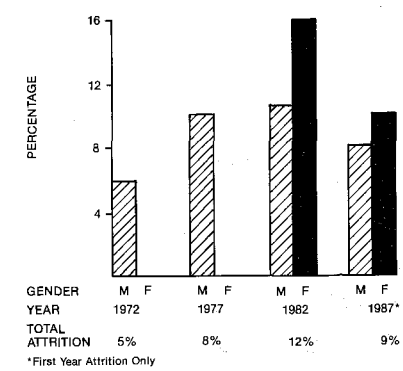
During the period when the percentage of women students was increasing and the aptitude scores decreasing, the student attrition rate at the College rose from 5% in 1972 to a high of 12% in 1982. This study was undertaken to explore the relationships, if any, among these observed trends.

Some important questions arise from these shifting entrance characteristics. Is gender a factor in the rate of attrition? How important are SAT or other achievement scores as predictors of success in optometric education? Is a decline in SAT scores explained by a change in gender composition?

There have been no published studies in the optometric literature which address the issue of attrition rate by SAT scores. However, some studies have focused on academic performance by gender. Kegel-Flom[4] reported an overall higher rate of academic attrition for men in a six-year study at the University of Houston College of Optometry. Her findings noted an equal dropout rate between men and women in the first three years of the study, but a higher dropout rate for men in the latter years. Trick, et al,[3] reported that women students performed academically at least as well as men students at the University of Missouri, St. Louis. These reports imply that women students at NEWENCO should be expected to perform as well as men, perhaps better. However, studies of medical students have revealed a higher attrition rate for women than men. In their 1966 study, Johnson and Hutchins[6] cite academic attrition rates in the cohort of students entering medical school between 1948 and 1958 of 15% for women and 8% for men. By contrast Braslow and Heins[7] cite much lower attrition rates among 1978-1979 medical students, 1.9% for men and 2.2% for women. Two factors were cited for the sharply reduced attrition rate among women. These are special support services for female medical students, and the existence of a critical mass of women to provide peer support. Both of

FIGURE 1

Four Year Attrition for Entering Class by Gender and Year



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these factors have implications for optometric education.

Methods and Results

To study the influences of gender and SAT level on attrition, we conducted a retrospective study of four entering class cohorts at NEWENCO. Classes for study were selected at five year intervals, beginning in 1972. A total of 304 subjects were selected. The data were categorized by SAT scores, gender and attrition. See Table 1 for summary data.

SAT scores were classified as: High (combined Mathematics and Verbal Ability scores above 1100), Middle (combined scores between 900 and 1100), and Low (combined scores less than 900). This classification is similar to the SAT stratification for four-year colleges in the ongoing longitudinal study of college freshmen conducted by the Cooperative Institutional Research Program.[8] SAT scores provide a reasonably constant standard of cognitive measure over a wide time period. This measure may be more reliable than OAT or OCAT scores which report a score based on a subset of all prior applicant performances.

Attrition was defined as failure to graduate in the normal four years. No distinction was made between academic and non-academic attrition. Such a distinction might reduce the importance of the SAT variable as a predictor of attrition if one assumes that the SAT variable is not highly correlated with non-academic attrition. Although the experience for the class entering in 1987 was limited to the first year, Johnson and Hutchins[6] reported that most attrition in medical schools occurs in the first year. We have noted that NEWENCO's attrition pattern is similar, and therefore assumed that a reasonably accurate estimate of total attrition for an entering cohort can be obtained by the end of the first year.

In the group of students studied, attrition increased from 5% of all students in the 1972 entering class to 12% for the 1982 entering class. The first year attrition for all students in the 1987 entering class was 9%. The percentage of attrition for women was zero in both 1972 and 1977. This rate rose to 16% in 1982, and was 10% for the first year of the 1987 entering class. Among male students, attrition rose steadily from 6.1% in 1972 to 11.3% in 1982. The male attrition rate for the first year of the entering class of 1987 was 8%. (See Figure 1.)

In Figure 1, attrition appears to be proportionally higher for women than for men in recent years. Also, attrition is higher in later years which have, on aver-

TABLE 1

Cross-tabulation of NEWENCO Student Data SAT Levels by Gender by Attrition

	Attrition		
	Yes	No	Totals
SAT Level			
Low			
Male	6	34	40
Female	4	19	23
Middle			
Male	7	81	88
Female	3	40	43
High			
Male	5	65	70
Female	2	38	40
Totals	27	277	304

TABLE 2

Summary of Model Fits

Model Specifications G = Gender S = SAT-level A = Attrition		Likelihood Ratio Chi-Square	df	p-value
Baseline Model of Main Effects:				
I	$F_{ijk} \equiv (G,S,A)$	5.1	7	.649
Models Testing Two-way Interactions:				
II	$F_{ijk} \equiv (G,S,A,G*S)$	4.7	5	.458
III	$F_{ijk} \equiv (G,S,A,G*A)$	5.1	6	.536
IV	$F_{ijk} \equiv (G,S,A,A*S)$	.7	5	.981
V	$F_{ijk} \equiv (G,S,A,G*S,G*A)$	4.6	4	.327
VI	$F_{ijk} \equiv (G,S,A,G*S,A*S)$	.3	3	.959
VII	$F_{ijk} \equiv (G,S,A,G*A,A*S)$	.7	4	.952
VIII	$F_{ijk} \equiv (G,S,A,G*S,G*A,A*S)$	.3	2	.877
Saturated Model with Three-way Interaction:				
IX	$F_{ijk} \equiv \{GSP\}$	.0	0	1.000

TABLE 3

Summary of Selected Model Parameters—Model IV

Parameter	Symbol	Estimate	Antilog	Predicted Odds
Main Effect of Attrition				
No Attrition	A_1	1.142	3.133*	
Attrition	A_2	-1.142	.319*	(N:A) = 9.8
Interaction of Attrition and SAT Level				
No Attrition*Lower	A_1S_1	-.308	.735*	
No Attrition*Middle	A_1S_2	.105	1.111	odds (A:N/S = 1)
No Attrition*Higher	A_1S_3	.203	1.225	odds (A:N/S = 2) = 2.3
Attrition*Lower	A_2S_1	.308	1.360*	
Attrition*Middle	A_2S_2	-.105	.900	odds (A:N/S = 1)
Attrition*Higher	A_2S_3	-.203	.816	odds (A:N/S = 3) = 2.8

*Z-value __ 1.96 v

age, lower SAT scores. These observations were tested through statistical analysis. The data were analyzed specifically to explore and test the extent to which the variation in attrition can be explained by gender and SAT score. Specific questions of interest include the following:

> Do men and women differ in their successful completion of the academic program controlling for SAT level?
>
> Do students with different SAT scores differ in attrition controlling for gender?
>
> What is the effect, if any, on the interaction of gender and SAT scores on attrition?

The data were collapsed across years into a 3x2x2 table which summarizes the three variables of interest. (See Table 1.)

We used log-linear modeling to examine the interaction among the variables summarized in Table 1. The log-linear model treats all variables alike, estimates the individual and combined effects of the variables, and summarizes all possible interactions among them.

The individual variables (gender, SAT level, and attrition) and their interactions were examined by constructing a series of hierarchial models beginning with the single effects of each variable and ending with the saturated model containing the three-way interaction. As more variables or their interactions are successively added to each model, the variation in the observed data is more fully explained. Therefore the chi-square value drops and the p-value increases. (See Table 2 for the model summary.)

The likelihood-ratio chi square (L^2) was reviewed for each successive model in order to identify the best fitting log-linear model to describe the cross-tabulation. The objective of this analysis step is to find a model that has a low L^2 value and that is significantly different from preceding, less complex models in the hierarchy. Using the decrement to L^2 as the goodness-of-fit statistic, the preferred model for explaining the main effects and their interactions is Model IV. The addition of the A*S interaction to Model I is found to be significant at the .15 alpha level (decrement L^2 4.4, df = 2). Therefore, we conclude that attrition is significantly related to SAT level in the three-way cross-tabulation. The addition of terms in subsequent models does not provide a significant improvement in fit including the addition of the three-way interaction in the saturated model (Model IX, Table 2). Therefore, we can conclude that gender is not significantly related to SAT level or attrition.

The expected frequencies predicted for each cell in Table 1 by Model IV were compared to the observed values using iterative proportional fitting computed by the SPSSx program. While the observed and expected cell counts are not equal, the differences are small. The standardized residuals for the model range between +/− .54. No cells have large residuals, which further supports the assertion that the model fits the observed data.

In order to further interpret the fitted model, the parameter coefficients of the model were determined. Table 3 provides a summary of the calculated odds for the component contributions of the interaction between performance and SAT. It is important to note that the significant component of the interaction term is the lower value category of the SAT variable.

The main results regarding the NEWENCO student population based on the interpretation of the model are:

(1) The predicted odds of completing the program of study in the expected four years are about 10 times greater than not completing the program in four years.

(2) The predicted odds of attrition among students with lower SAT scores are about three times greater than the odds of attrition for students with higher SAT scores, and about two times greater than for students with middle scores.

Discussion and Conclusions

The analysis reveals that there is a positive relationship between attrition and the SAT levels of entering students, especially in the likelihood of attrition if an applicant's combined scores are below 900. However, no substantiated difference by gender was revealed. When controlling for SAT level, attrition is similar for men and women.

We did not distinguish between academic and non-academic attrition. The study of medical school attrition[6] has shown that most of the first year attrition is for academic reasons, but non-academic attrition increases in subsequent years. It is often difficult to make a clear distinction between the two types. A student's academic difficulties may be primarily a function of family or personal reasons. Conversely, withdrawal for so-called non-academic reasons, such as lack of interest in optometry or a misperception of anticipated versus actual school experience, may in fact be due to problems encountered in handling the academic rigors of academic study.

In any event, attrition in optometry schools is a complex issue. Attrition represents a loss of time and money to the student and it creates a vacancy that could have been filled by a student who would have graduated with his or her entering class. It is important that optometry schools give increasing attention to studying the causative factors of attrition and their respective interaction. Prior work has demonstrated that standardized admissions tests are useful predictors of academic performance.[9] Based on this study, we believe that an applicant's SAT level can also serve as a relative predictor of academic success. Further, only the lower SAT level (less than 900 combined) was found to be significant. This indicates that the value of predicting attrition from such indicators is probably limited to the lower extremes.

Finally, this study illustrates the usefulness of log-linear models for contingency table analysis. This analysis method is a relatively new development in the social sciences and has ready application to questions within education. It is particularly useful in large multi-way cross-tabulations when freedom from identification of a dependent variable is desirable. The interested reader is directed to the monograph by Knoke and Burke[10] for an excellent introduction to this statistical approach. □

Acknowledgement

Our thanks to Ann Kent, Stephanie Paris and Joanne McIntosh for their valuable assistance in data collection and preparation of this article.

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Patient Assessment Diagram: An Integrative Teaching Model

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Abstract

Assessment and management of the patient's problem is an integral part of case analysis. Unfortunately, this is often the hardest component for the student to master. The majority of optometric programs do not offer formal courses in problem solving. A new integrative model has been designed to bridge this deficit by assisting students in developing integrative skills. This paper discusses traditional problem solving methods and introduces the new model designated as the Patient Assessment Diagram (PAD).

Key words: *optometric education, patient management problems, case analysis, patient assessment diagram*

Introduction

Proper patient management entails not only basic data collection but also assimilation of data into an appropriate system of quality care for the patient. To effectively solve problems, the student must gather relevant data, identify and prioritize problems, develop an individualized approach for problem resolution, and identify alternate solutions in the event of erroneous assessments.

How do we as clinical instructors help students to effectively evaluate data, synehtsize it, and designate an appropriate course of action for problem resolution? Various methods for developing problem solving skills have evolved to address this issue.

Drs. Jay and Karla Rumsey are assistant professors at the University of Houston College of Optometry.

Assessment Techniques

The traditional clinical approach is comprised of direct observation of student clinical performance.[1] A faculty member oversees a student's examination of a patient. At the conclusion of the examination, the faculty member discusses the case in detail with the student and questions the student concerning aspects of the case. This questioning technique is also amenable to small groups, as in seminar discussions. Through the questioning process, the student learns the art of good patient observation skills and transfers this knowledge to other patient encounters. Although an effective teaching tool for some students, intimidation precludes learning for other students. An additional drawback with this system is the inequity in patient exposures. Some students encounter only simple cases whereas others experience more complex problems. Subjectivity in grading is a major factor. The student's score benefits or is adversely affected by the halo effect or prejudging of performance based on previous encounters with the student.[2]

A clinical tool widely utilized in medicine is one using simulated patients. Students or patients are trained to act as patients with a particular disorder. The clinician's performance is then evaluated from a checklist of acceptable parameters developed by clinical faculty. This format involves interactive communication skills and is, therefore, preferable to paper and pen exercises. Another advantage is the evaluation of all students on cases of similar content and difficulty. To be standardized, however, this format involves the training of many subjects who must be knowledgeable in the symptomology, objective signs, and treatment of a particular clinical entity.[3]

Patients may also be simulated through the use of videotapes and video discs.[3] Videotapes of both soft and rigid lens fittings are integral to the teaching of contact lens evaluation at the University of Houston College of Optometry. These formats provide regulation of degree of difficulty of cases, uniform exposure to patient problems, and may be recycled for future use.

Patient management problems (PMP) are paper and pencil exercises designed to both teach and assess clinical integrative skills. Advantages include economy of reproduction, standardization of clinical experiences, and ease of re-evaluation of the cases. Disadvantages include complex scoring, time for preparation and administration, linear format, and cueing.[3,4] PMP's may also be computer based. Computer generated PMP's prevent cueing of the student because not all options are visible. The case may also be designed in a branching format forcing the student to follow through a particular treatment course and outcome. Computer based PMP's provide the student with the opportunity to increase clinical integration skills without the presence of faculty or classroom teaching.[3]

Patient Assessment Diagram

Assessment and management of the patient's problem is an integral part of the optometric examination. However, as clinical instructors are aware, this component of the examination is often the most difficult for the student clinician. Russell[5] has developed a model to aid the

student in organizing and integrating the patient's data into a diagnosis and management plan for the patient. In medicine, this model is designated as "Condition Diagramming."[5] This model has been adapted to optometry and designated the "Patient Assessment Diagram" or PAD.

The diagram is organized around the patient's diagnosis which occupies the central portion of the diagram (see Figure 1). Beginning at the upper left position of the diagram with the Pertinent Data, the diagram then advances from left to right. Students are given a patient record with all the minimum database examination results (Figure 2). Students must then incorporate these findings into the PAD. All information under the headings of pertinent data, tentative diagnosis, and additional tests/questions is to be recorded in a specific colored ink such as purple or green which will be supplied by the instructor. All data which the students deem as pertinent to the case including case history findings is placed under the heading of Pertinent Data and numbered sequentially. Students then advance to the right to the next heading which is Tentative Diagnosis. At this time, students must assess the case and list all possible diagnoses based on the information obtained from the pertinent data. To prioritize the data, tentative diagnoses should be listed in order (from the most likely as number 1 to the least likely as the last number). If an error is made, the tentative diagnoses may be numbered out of sequence. For example, 2, 1, 3, 4, 6, 5. In parentheses at the end of each diagnosis, students should list the number of each of the pertinent data findings which lead them to make that assessment of the patient's problem. In other words, students must justify their answers.

The students then advance to the right to the Additional Test sectionof the diagram. The additional tests/questions section provides students with the opportunity to request results of additional procedures or address questions to the

TABLE 1.
PAD Subjects

Participants	Class Year
67	Second
17	Third

84 Total Responses

TABLE 2.
PAD Questionnaire Results

100% felt PADs were beneficial for developing integrative skills
85% thought PADs should be introduced early in curriculum
78% suggested PADs be presented as a required course
22% preferred PADs be offered as an elective course

FIGURE 1

Student's name:
Patient's name:

PERTINENT DATA	TENTATIVE DIAGNOSIS	ADDITIONAL TESTS/ QUESTIONS
1.	1.	1.

DIAGNOSIS
1.

PLAN	PROGNOSIS/ COMPLICATIONS
1.	1.

FIGURE 2

Patient: PR

C.L. type: Paraperm 02 Plus
Care regimen: Boston Soaking Solution
Boston Lens Cleaner

S: Routine progress check. Complains of tired, dry eyes occurring about 7:00 pm each day. Lenses feel fine until then. Vision is good most of the time but becomes slightly blurred at the end of the day. WT 6/15

O: VA with cls O.D. 20/20
O.S. 20/25

OR: O.D. PI 20/20
O.S. -0.25 DS 20/20

SLE:

O.D.	O.S.
slight pooling centrally	alignment centrally
slight bearing on SC	slight bearing on SC
good peripheral pooling	good peripheral pooling
2 mm lag after blink	2 mm lag after blink
lens positions centrally	lens positions centrally
lenses slightly scratched	lenses slightly scratched
moderate lipid buildup	moderate lipid buildup
1+ superficial punctate keratitis centrally	1+ SPK centrally
2+ 3-9 staining	2+ 3-9 staining
palpebral conjunctiva clear UL and LL	palpebral conjunctiva clear UL and LL
no injection	no injection
TBUT 10 secs	TBUT 10 secs

patient to aid in determination of a final diagnosis. Under this section, students should list any additional tests or additional information such as any questions which they would like to address to the patient. Again, following the additional test recording students should list the numbers of the tentative diagnoses in parentheses to which this test would contribute significant information.

Next, students will give the instructor their colored ink pens and will in exchange be given a list of the additional test results (Figure 3). Students may now add to their list of additional questions and the other previously completed headings in their own pen or pencil. The change in ink color will allow the instructor to assess how much inormation the students added to the diagram after cueing from the list of additional tests. Utilizing this additional information, students must now make a final diagnosis or diagnoses. Again, the answers for the rest of the diagram will be recorded in the students' own pen or pencil. The possible diagnoses should be listed in the order of most likely to the least likely when applicable. A refractive diagnosis should also be included in the diagnosis when applicable.

The students now proceed to the plan located at the lower left of the form. Here students must list their plan for management of each of the patient's problems, including spectacle RX (which may be adjusted to facilitate adaptation), vision training (name the particular procedures to be used), referral to other specialties, care regimens for contact lens patients, and recommended follow-up visits when applicable.

Continuing to the right, the next heading is prognosis/complications. Under this section, students must list the possible sequelae of the patient's condition such as the loss of central vision in the example of wet age-related macular degeneration. Another example would be the continuation of asthenopia if a patient were noncompliant in the treatment of convergence insufficiency or the resolution of the asthenopia in the event of compliance. Treatment risks should be mentioned. In addition, the expected dura-

FIGURE 3

Additional Tests or Questions

Patient: PR

Both lenses are one year old.

The symptoms started approximately one month ago.

The patient's environment has remained the same over the past year.

Conjunctival smear was negative OD and OS.

The patient does not suffer from seasonal allergies.

The patient does not take any medications.

Cleaning the lenses relieves symptoms slightly.

Eyes feel comfortable when wearing a spectacle correction versus contact lenses.

The patient does not experience any spectacle blur.

FIGURE 4

Student's Name:
Patient's Name: PR

PERTINENT DATA

1. Tired, dry eyes around 7:00 pm each day.
2. VA blurred towards end of day
3. Lenses fit well
4. Lenses scratched
5. Lipid buildup on lenses
6. 1+ SPK centrally
7. 2+ 3-9 staining
8. Wearing Parapern 02 plus lenses
9. Using Boston solutions.

TENTATIVE DIAGNOSIS

1. Coated lenses (1, 4, 5, 6).
2. Solution allergy (1, 6)
3. Corneal & conjunctival infection (6, 7)

ADDED TESTS & QUESTIONS

1. Does cleaning the lenses make them more comfortable? (1)
2. Do eyes still feel irritated after CL removal (2)
3. Conjunctival smears (2, 3)
4. Is VA good with spec RX?
5. Does cleaning the lens improve the VA?

DIAGNOSIS

1. Coated lenses

PLAN

1. Clean & polish lenses
2. Use enzymatic cleaner once a week
3. RTC in 1 week to see if symptomology has resolved.

PROGNOSIS/COMPLICATIONS

1. Increased comfort and longer wear time.
2. Better vision
3. If does not comply with cleaning, symptoms will worsen until CL removal is necessitated.

tion and prognosis of vision therapy should also be included under this heading. Completion of the prognosis/complication section allows students to visualize the sequelae of their treatment plan. The cycle of the PAD is now complete (Figure 4).

Methods

The PAD was administered to 84 optometry students consisting of 67 second year and 17 third year students at the University of Houston College of Optometry (Table 1). Complete instructions including a sample case were provided to each student. A discussion of the case followed completion of the PAD. At the conclusion of the case discussion, students answered a questionnaire concerning the PAD. Questions addressed the PAD design, clarity of instructions, and relevancy of the exercise. If students responded positively to the question "Are these exercises beneficial in helping you develop integrative skills?," they were asked to complete the following questions:

1. In which clinical years should these exercises first be introduced?
2. Should a clinical integrative course be a required part of the curriculum or is it best offered as an elective?
3. What is the optimum class size for this type of exercise?

Results

Of the students surveyed, 100% responded they felt the PAD was beneficial in developing integrative skills. Eighty-five percent feel PADs should be introduced early in the professional program. The majority of students (78%) stated a clinical integration course is best offered as a required course with 22% preferring an elective course (Table 2). The mode response for optimum class size was 20.

Discussion

Clinical integration skills are among the most difficult skills to master. The current optometric program at the University of Houston College of Optometry does not offer a formal course in case assessment. PADs bridge this deficit by assisting students in developing integrative skills. Students respond favorably to PADs particularly when administered in conjunction with a small discussion group. All clinic experiences can be incorporated into PADs. For example, PADs can be designed to demonstrate management of pathology, binocular vision, refractive errors, low vision problems, and amblyopia. The flexibility of PADs allows incorporation of other formats such as ocular pathology slides, videotapes of case histories, and slides or videotapes of contact lens fittings and problems. Real, rather than simulated, patients may be utilized with this format when obtaining the pertinent data.

Although PADs may be viewed as modified PMPs, PADs offer advantages over that format. PADs require minimal preparatory time. PMPs, however, are time-consuming to design and in the case of latent image PMPs, require special materials and equipment to produce. As the PAD format is less complex than the PMP, PADs are easier to administer. Students are cued in both formats; however, PADs allow the instructor to assess the cueing effect. Scoring for both PADs and PMPs remains complex and requires further investigation.

Case discussion at the conclusion of the PAD enhances the student's experience. Discussion in small groups facilitates the flow of ideas and provides feedback to students concerning their knowledge as compared to their peers.

Other applications for the PAD in the optometric curriculum include requirement of successful completion of PAD exercises prior to promotion to an advanced clinical level. PADs also enhance student experience through exposure to a variety of clinical cases and can provide remediation in a particular clinical topic. PADs compare written objective evaluation with subjective evaluation of clinical competency. Another application is for the assessment of integrative skills and knowledge of alternative diagnostic procedures of transfer students. At the University of Houston College of Optometry, PADs will be offered as a clinical integration course beginning in the fall of 1988. A computer assisted PAD is currently in development. □

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ASCO NEWSMAKERS

Pictured at the 1989 General Delegates Meeting of the International Optometric and Optical League held in Luxembourg are left to right: Dr. Burtt Holmes, League president, Dr. William Baldwin, dean of the College of Optometry at the University of Houston who delivered the H. Moss Memorial Lecture, and Dr. Henry Hoffstetter who introduced Dr. Baldwin.

ASCO's NEW OFFICERS

Jerry L. Christensen, O.D., Ph.D.
President

Dr. Christensen is dean of the University of Missouri St. Louis School of Optometry, St. Louis, Missouri. He was appointed as the first dean when the school opened in June, 1980.

Dr. Christensen received his bachelors, masters and doctoral degrees from the Ohio State University in Columbus, Ohio. After completing his doctorate, Dr. Christensen became a faculty member at the New England College of Optometry in Boston, Massachusetts. He served as an assistant professor and track coordinator of Physiological Optics. In 1974, he joined the faculty of the University of Alabama in Birmingham School of Optometry/The Medical Center. He served as assistant dean of student affairs from 1974 to 1976, and as chairman of the Department of Physiological Optics and director of the graduate program from 1976 to 1980.

Dr. Christensen has participated as a member of the National Advisory Eye Council—the advisory council to the National Eye Institute, the Scientific Advisory Board of the Friends of Eye Research and Therapy, the American Academy of Optometry and the Association for Research in Vision and Ophthalmology. In 1975, he received an American Council of Education Fellowship in Academic Administration. He recently completed a four-year term on the Council on Optometric Education.

William E. Cochran, O.D.
President-Elect

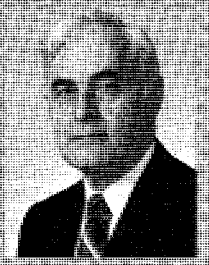
Dr. Cochran is president of the Southern College of Optometry, Memphis, Tennessee. Dr. Cochran has held many administrative positions in civic and professional organizations. His American Optometric Association activities have included Leadership Development, Nominating Committee, NOW Chairman, Keyperson, and Communications Division Executive Committee. He served through the chairs of the Mississippi Optometric Association including president in 1978. He is a Fellow of the American Academy of Optometry and a member of the AOA Member Services Center Executive Committee.

Dr. Cochran has been active in the Southern Council of Optometrists by chairing the Long-Range Planning Committee in 1982 and the Economic Affairs Forum in 1981. He served on the Board of Directors of the Better Vision Institute, Inc. and as vice-president in 1984.

As a student at Southern College of Optometry, Dr. Cochran served as the Student Government Association President, was named Outstanding Senior in 1968 and was elected to the Gold Key Honor Society. He served as an officer in the United States Army from 1968-70.

While practicing in Mississippi, he was active in civic organizations and was awarded the Outstanding Citizen Award and the Jaycee Distinguished Service Award of his community. He was a member of his community's Board of Directors of the Chamber of Commerce and served as president of the Jaycees and Lions Club.

Since moving to Memphis to become Southern College of Optometry's fifth president, Dr. Cochran has become active in the Tennessee Optometric Association and the Memphis Rotary Club.



Bradford W. Wild, O.D., Ph.D.
Vice-President

Dr. Wild is dean of the University of Alabama at Birmingham School of Optometry. He received his Ph.D. degree in Physiological Optics from The Ohio State University, his optometry degree from Columbia University and his bachelor's degree from Brown University. He received the Honorary Doctor of Science degree from Southern California College of Optometry.

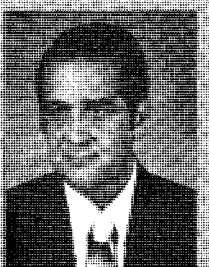
Prior to being appointed dean at UAB, Dr. Wild served as the UAB associate dean and director of the professional program for 12 years. He is a senior scholar in the Center for Health Risk Assessment and Disease Prevention, UAB School of Public Health. He was dean at the Pacific University College of Optometry for five years before joining the faculty at UAB. He was a member of The Ohio State University faculty from 1955 to 1969 and was the director of clinics there for 10 years. Prior to serving in the U.S. Army from 1953 to 1955, he was in private optometry practice in Fall River, Massachusetts.

Dr. Wild is a past president of the American Academy of Optometry and of The Ohio Optometric Association. He served for 12 years on the Council on Optometric Education of the American Optometric Association, and was the chairman of the council from 1984 to 1985. He has served as head of the American Optometric Association's Division of Public Health Optometry, and has served on the Public Health and Optometric Care Committee and the Committee on Publications for the AOA.

He has served on the board of directors for the American Rural Health Association and the American Optometric Foundation.

He currently chairs the Committee on Admittance, Scientist/Educator Division of the American Academy of Optometry. He has been a member of the Editorial Council of the American Journal of Optometry and Physiological Optics.

He served on the National Academy of Sciences, National Institute of Medicine's Cost Study Advisory Committee and has worked on a variety of professional and community committees.



Arthur J. Afanador, O.D., Ph.D.
Secretary-Treasurer

Dr. Afanador is dean of the School of Optometry at Inter American University of Puerto Rico. He was appointed the first dean of the School in August 1981 following Dr. Henry Hofstetter who was acting dean when the school started in January 1981.

Dr. Afanador received his Ph.D. from the University of California at Berkeley in 1972 and his O.D. from Southern College of Optometry in 1965. He practiced optometry for two years in Brandon, Florida, and served two years as captain in the Army. He served at Indiana University as assistant professor, associate professor, director of electrodiagnostic clinic, chairment of the Department of Visual Science and published over 15 articles in the area of Neurophysiology and Electrodiagnostic procedures.

Dr. Afanador has helped develop the School of Optometry in Guatemala and Peru, helped develop the School of Optic in Santiago, Chile, and was named honorary president of the School; developed a student exchange program with the LaSalle University of Bogota, Colombia, and was named honorary professor of its graduate program on corneal physiology and contact lenses; developed a special program at Inter American University for five Italian educators who graduated in 1985 and started the first Doctor of Optometry School at Verona, Italy, and was named honorary president in 1986. Dr. Afanador has served as treasurer and president-elect of the Inter American Optometric Federation and will assume the presidency in 1990 in Brazil.

Association of Schools and Colleges of Optometry 1988-1989

ANNUAL REPORT

President's Message

This past year saw a continuation of ASCO's transition under new direction and management precipitated by the change in executive leadership and the continued implementation of the Association's strategic plan. I conclude my second year as president with mixed feelings. While much remains to be done, progress, however slow and awkward, has been made and the Association is moving forward. Allow me to touch on some of the past year's activity.

Executive Leadership

Mr. Robert Boerner continues to grow and develop in his position as executive director. His experience and knowledge in the student affairs area have served ASCO well as strategic plan programming continues. He continues to represent ASCO well with other organizations, agencies, and publics. The addition of Ms. Joanne Zuckerman as staff assistant in the national office should enhance his and the central office's effectiveness and efficiency.

Other Agencies and Organizations

There seems to be an increased awareness of ASCO by other organizations within the optometric and health care community as evidenced by the requests made by these groups for ASCO input, participation, and/or advice. While this is a very positive development, it has placed some strains on our collective ability to accommodate those requests. These include meetings with the AOA, IAB, NBEO, AOSA, AOF, etc. and increased liaison activity with many other groups.

Program Activities

Major program activity continued in the student affairs area in keeping with the thrust of the strategic plan. Under the very capable direction of chairman Dr. Dave Corliss, the Council on Student Affairs activities included completion of the recruitment video which is now ready for distribution and will be shown at the AOA House of Delegates at this meeting, development of other recruitment material, operation of a pilot placement program, implementation and evaluation of the new OAT test, development of application "traffic rules," and minority recruitment activities.

Florida Schools

A significant amount of time and effort during the year was spent on the issue of the two proposed new schools in Florida. ASCO appropriately took no official position with regard to support for either school, except to restate our 1976 policy statement on new schools, but rather tried to serve as an avenue for all interested parties to exchange thoughts and ideas. This position was not universally accepted but I am convinced was, and is, appropriate. As of this writing, the Illinois College of Optometry has announced that they are not pursuing the establishment of a Florida campus; the Southeastern University of the Health Sciences is proceeding with all necessary activity to start educating their first class of optometry students in the fall of 1989.

VA Residencies

While far from being finally resolved, considerable activity and some progress has occurred with regard to our efforts to enhance the optometric residencies within the Veterans Administration. Under the able direction of Dr. Norman Haffner, the optometry residency program has been transferred from allied health to medicine and dentistry. The promised increases in number of residencies and stipend level have not yet been secured as of this writing. This issue will be discussed in depth during the annual meeting.

Other Issues

Other areas of activities and/or accomplishments worthy of note during the year include: the NBEO specialty certification efforts; various state board licensing and DPA, TPA and continuing education certification issues; successful completion of the Administration on Aging geriatric grant activities; and the realignment of the sustaining member dues structure.

Finis

The close of this annual meeting marks the end of my term as your president. It has been a most active and interesting two years both personally and professionally. I would hope that the past two years will be remembered as ones of some progress for ASCO, however Brobdingnagian or Lilliputian by your individual standards. In any event, I appreciate having had this opportunity to serve.

Respectfully submitted,

Jack W. Bennett, O.D.
President
June 1, 1989

National Activities

Veterans Administration

As the ASCO board determined at its March 1989 meeting, a group consisting of Dr. Haffner, Dr. Bennett, Dr. Banwell and Dr. Hopping has been formed to meet with Secretary Derwinski of the VA to discuss our concern over the VA's failure to honor the agreement with ASCO and the AOA to raise stipends for optometric residents. Dr. Bennett wrote to Mr. Derwinski in April. The response said that nothing could be done until the status of supplemental appropriations was known and suggested that if ASCO wished to pursue the matter, Dr. Gronvall would be willing to meet with us. Dr. Gronvall's office has been contacted for an appointment.

Administration on Aging

Activities pertinent to the grant which ASCO received from the Administration on Aging in September, 1987 were successfully completed. A clinical teaching module and manual were produced. All schools that have not done so are urged to conduct their local gerontology workshops for faculty which was stipulated by the contract with AOA. A follow-up grant has been applied for, the results of which will not be known until later in the fall.

Health Omnibus Program Extension Act of 1988, PL 100-607

Dr. Haffner has raised the issue of potential funding for optometry from sections of this legislation not previously explored by ASCO. ASCO has obtained the support of AOA Federal Relations Committee and staff to cooperate in identifying the sections of this legislation most suitable for the inclusion of optometry. ASCO needs to work with AOA to develop language supporting arguments and data to include funding for optometry in this legislation and to approach appropriate legislators—especially members of the Labor and Human Resources Committee in the Senate and the Energy and Commerce Committee in the House —to obtain their support.

Migrant Health Vision Demonstration Projects

On April 26, 1989, Dr. Ian Berger, Dr. Satya Verma and Mr. Robert Boerner met with Maria Lago from the Bureau of Health Professions Migrant Health Program and seven representatives from migrant health centers to discuss a transition from demonstration projects to four pilot programs for continuing vision care at four migrant health centers. We subsequently created a proposal to develop one video to train migrant health center personnel to perform vision screening, and another video to increase the awareness of migrant health center personnel and migrant workers to the need for good vision care as well as various other training elements which could eventually be adopted by many other migrant health centers. In June we received funding of $40,000 for this activity.

Electronic Mail

The electronic mail network is developing. UMSL, UAB, SCO, SCCO and IU are on line and several more schools are in process. We do hope that the other schools will consider expending the minimal time and resources required to join the network.

Dr. Leon Gross (NBEO) discusses the results of the first PEP test. Studying the results is Dr. Jack Bennett, outgoing ASCO president.

Sustaining Member Program

The number of sustaining members is 23. We are actively pursuing several companies for membership. Suggestions for other potential sustaining members will be appreciated.

Annual Survey Revision

The Annual Survey Revision is proceeding. A special session of the Executive Committee was held at this meeting to finalize a draft of the new survey. It is hoped that the draft survey can be circulated and approved in time for use in the fall of 1989.

Applicant Data

The request of the Council on Student Affairs for improved and periodic applicant data is in process. Proposed formats for bimonthly and annual surveys were sent by the national office to the schools. The topic will be discussed again at the Council's June meeting. The existing Applicant Status Report is being processed by the national office.

Spotted during a coffee break are Dr. Dave Corliss, chairman of the Council on Student Affairs and incoming ASCO president Dr. Jerry Christensen.

National Activities

Section 89 of the Tax Reform Act of 1986

The most recent information as of this writing is that implementation of Section 89 which is designed to ensure equitable benefit programs for employees has been postponed until October 1, 1989. There is still a movement in the Congress for repeal, but Mr. Rostenkowski, Chairman of the House Ways and Means Committee, continues to push for revision rather than repeal. As presently constituted there is general agreement that Section 89 would be prohibitively complicated and expensive to implement.

Anti-Drug Abuse Act of 1988

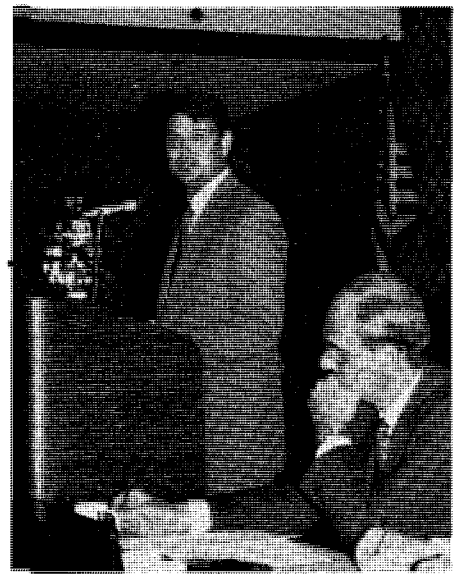
This act stipulates that any entity doing business with the Federal Government must certify a drug-free workplace which requires a statement of policies and procedures and establishment of a drug-free awareness program. An ASCO drug abuse policy was approved by the Executive Committee in June.

Mr. Robert Boerner, ASCO executive director, introduces the new ASCO video on student recruitment to visitors to the ASCO exhibit booth.

Board Meetings

In addition to the 1988 Annual Meeting in Chicago, Illinois, and the Board of Directors meetings at the University of California—Berkeley in Berkeley, California, and the University of Houston in Houston, Texas, ASCO hosted the Tripartite Meeting in Key West, Florida in September 1988 and met with AOA officers and staff in Columbus, Ohio in December 1988. Our thanks go to Drs. Enoch and Carter at UCB and Dr. Baldwin at Houston for excellent meeting arrangements and entertainment.

The National Association of Advisors for the Health Professions held only regional meetings this year. ASCO members attended all four of the regional meetings and optometry was on the agenda in all but one region. Next year the NAAHP Annual Meeting will take place in San Diego, California. We have already conducted lengthy negotiations to attempt to assure that optometry receives proper visibility on the program for that meeting before we commit to sponsoring a meal or reception for the advisors.



Mr. Jim Robinson of Allergan outlines the Pathways in Optometry Program for ASCO's Board.

Student Endowment Fund

The ASCO student endowment fund provided over $12,000 to the 16 U.S. Optometry schools for financial aid for students. Most of these funds were used for individual scholarships or emergency loans.

Secretary's Award for Health Promotion and Disease Prevention

This year no papers were submitted from optometry for this award competition. I hope that next year you will try to encourage your students to participate.

Residency Directory

The 1988 directory of Residencies/Graduate Programs was produced again this fall. Our thanks go to the schools for providing accurate information for this publication.

Faculty Directory

This year the 1989-90 Faculty Directory was produced. Our thanks for your cooperation with it. The format was changed to make it more useful, and your reaction to the new format will be appreciated. Only a few additional copies were ordered by the schools at the $12.50 price, so at the next printing we plan to produce fewer copies.

ASCO Staff

Our thanks once again go to Mrs. Patricia O'Rourke, Managing Editor of JOE, Mary Auman, Secretary/Office Manager, and Jackie Doyle, Project Manager for the Administration on Aging Grant, whose effectiveness and pleasant demeanor are very much appreciated. In July we welcomed our new staff assistant Ms. Joanne Zuckerman whose responsibilities will focus on student recruitment and student affairs issues.

Council on Student Affairs

Student Recruitment

The student recruitment video is complete and copies have been distributed to all optometry schools for immediate use in their recruitment efforts. The Task Force is working on plans for wide distribution of the video during the coming year. (Information on ordering the video is found on page 30.)

The new brochure and poster were coordinated with the video and use similar visual images and language. The new "first contact" brochure and poster also have been distributed to the schools.

Special thanks should go to Ms. Eydie Jones at the University of Alabama at Birmingham for her work in coordinating the production of the video. The entire Task Force has spent many hours on these projects and has done an excellent job under difficult circumstances.

Plans are underway for developing a notebook of information on optometry. This notebook could be distributed to optometrists who give talks at schools or to other groups. It will contain pages which can be updated or changed for use by other types of persons, e.g., practitioners, advisors or optometry students who might also want to give talks about aspects of the profession.

Placement

The Pilot Placement Project was funded to continue through June 1990. The project is coordinated through the School of Optometry at the University of Missouri-St. Louis. ASCO also agreed to continue to discuss the future of this project.

Plans are underway to conduct a workshop on placement at the January 1990 AOSA meeting in Tulsa, Oklahoma. Ms. Sharon Davis (UMSL) has coordinated efforts of the AOSA and the CSA for this project.

Ms. Davis also is working on various publications which will help students and providers understand the current situation in optometry from both points of view. These publications will aid student planning and will educate providers about a graduate's needs and expectations.

Application Guidelines

CSA member Dr. Lorraine Voorhees (SCCO) wrote a proposal for cooperation among the schools and colleges in their efforts to admit students in a manner that is equitable for both students and schools.

The proposed guidelines were discussed in detail at the January CSA meeting and a draft copy of the results of that meeting was circulated to all schools for further consideration. The final draft was discussed by the ASCO Board at its June meeting. At that time the Board passed a resolution recognizing the importance of guidelines throughout the admissions process for students and schools. ASCO is committed to developing the guidelines further through action at future board meetings.

OAT Registrations

Dr. Dave Corliss, CSA chair, reported a troubling 30% decline in the number of students registered to take the February 1989 Optometry Admissions Test (as compared to spring 1988). He expressed his hope that the decline was due in part to moving the test from March to February without a concurrent change in the date on which test applications are mailed to health advisors. Test materials are being mailed earlier in fall 1989 to alleviate this problem.

Ms. Claire O'Brien, AOSA liaison to ASCO, consults with Mr. Robert Boerner, ASCO executive director.

New Appointments

Dr. Thomas L. Lewis was named the fifth president of the Pennsylvania College of Optometry. Dr. Lewis is an associate professor who has served as dean of academic affairs at the College since 1980. He succeeds Dr. Melvin D. Wolfberg who served as president for 10 years.

Dr. Sylvio L. Dupuis resigned as president of the New England College of Optometry to become president and CEO of the Catholic Medical Center in Manchester, New Hampshire. Dr. Larry Clausen will serve as president ad interim.

Dr. Kenneth J. Meyers, formerly director, optometry service, at the Veterans Administration, was named dean of the Ferris State University College of Optometry.

Dr. Arthur Afanador confers with Dr. Brad Wild (l) and Dr. Giovanni De Stefani (r).

1989 Annual Meeting

Election of Officers

At its Annual Meeting held at the Sheraton Centre Hotel June 23-26, 1989, the Association of Schools and Colleges of Optometry (ASCO) elected new officers for the next two years. They are: president—Jerry L. Christensen, O.D., Ph.D., dean of the University of Missouri-St. Louis School of Optometry; president-elect—William E. Cochran, O.D., president of Southern College of Optometry, Memphis, Tennessee; vice-president—Bradford W. Wild, O.D., Ph.D., dean of the University of Alabama at Birmingham; and secretary-treasurer —Arthur Afanador, O.D., Ph.D., dean of Inter American University School of Optometry in San Juan, Puerto Rico.

Resolutions Passed

At the meeting, recognition by resolution was accorded to Dr. Melvin D. Wolfberg who is retiring as president of the Pennsylvania College of Optometry.

By means of resolution, ASCO also commended the Council on Student Affairs for its work in student recruitment, especially the development of the video, "Is Your Future in Sight?" Another resolution underscored ASCO's intent to adopt in October, 1989, guidelines and recommended principles for the admission of students to optometry schools.

Annual Luncheon

There were 36 representatives of the 16 United States schools and colleges of optometry in attendance as well as associate members from the University of Montreal and the College of Optometry in Verona, Italy. Also represented at the meeting was the Southeastern University College of Optometry, voted in as a provisional member. Representatives of the American Optometric Student Association, the National Board of Examiners in Optometry, the Council on Optometric Education, the American Optometric Association, the College of Optometrists in Vision Development and the American Optometric Foundation also were in attendance.

Ms. Donna Chastain, AOSA president, presents her report to the Board.

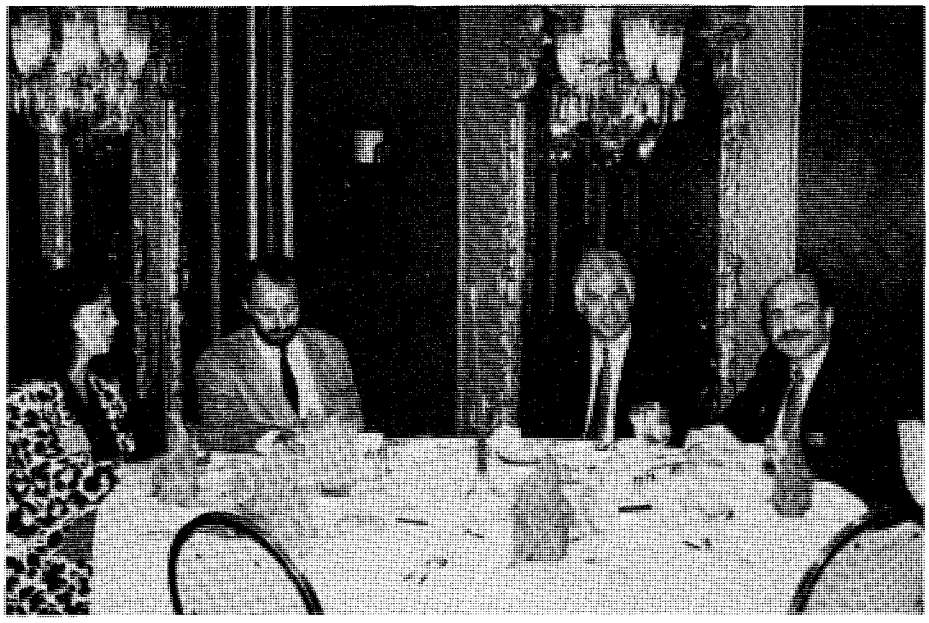
ASCO Sustaining Member Dr. B.J. Shannon of Ciba Vision Care gets reacquainted with Dr. Richard Hopping at ASCO's annual luncheon.

1989 Annual Meeting

In other meeting activities, ASCO sustaining members met with member school deans, presidents and faculty at both an evening reception and a luncheon. This meeting also continued an opportunity for sustaining members to speak before ASCO's Board. Two sustaining members—Mr. Skip Michael of Fused Kontacts and Mr. Jim Robinson of Allergan Optical spoke with the Board on matters of mutual concern in the profession. Mr. Robinson, vice-president of the Eyecare Group at Allergan, described an exciting program being initiated by Allergan in conjunction with the schools—the Pathways in Optometry Program—to improve the practice management skills of graduating optometrists.

A highlight of ASCO's meeting was the annual luncheon program. The luncheon speaker was Dr. Alden N. Haffner, president of the State University of New York, State College of Optometry. Dr. Haffner's remarks addressed critical areas facing optometric education in the immediate future.

1. For the period of the last fifteen years, optometric education has had to make significant changes in its curriculum occasioned by the development of DPA and TPA legislation in the various states. These changes have included alterations of curricular content, the addition of new curricular resources, the addition of newer faculty resources and the addition of new clinical resources. Dr. Haffner complained that there was a critical need for major expansion of external funding of optometric education. Optometric education has largely been reallocating its resources, "particularly at the edges," and without a major infusion of needed incremental funding. He called upon the leadership of the American Optometric Association, and of the related optometric organizations, to address this lack of adequate funding. In addition, he strongly recommended the necessity for new federal manpower legislation dealing directly with this question. Dr. Haffner said there was a need for an infusion of a minimum of $50 million into optometric education in the next seven years.



Invited as ASCO's guests at the annual luncheon are Ms. Danne Ventura and Dr. Rod Tahran from Varilux, Mr. Dan Miller, Alcon and Mr. Jim Metz of Sola Optical. Varilux, Alcon and Sola are ASCO Sustaining Members.

Dr. Norman Haffner, president, SUNY State College of Optometry, addresses ASCO's annual meeting luncheon guests.

2. Dr. Haffner pointed out that the process of "assessment and accountability" of optometric institutions was needed and that it was not different from that which major post-secondary institutions were undergoing across the country. This process has been occasioned by the reports of the American Council on Education and a number of other national educational bodies including the Education Commission of the States.

3. Dr. Haffner warned of an immediate crisis in the manpower pool relating to student recruitment. He predicted that 1989 would be a watershed year in which recruitment of talented new students into the profession will have peaked and begun to decline. This downward slide is of very serious moment and he cited as evidence the thirty percent decline of registrants in the February 1989 Optometry Admissions Test (OAT), as compared with Spring 1988. He called upon AOA's leadership, together with ASCO and all affiliated organizations, to develop and launch a new national manpower initiative. Dr. Haffner warned that failure to invest major new resources could prove to be a serious impediment to further growth of the profession. The addition of a new school in Florida providing the availability of up to 100 new seats per class at a time when a very shallow student applicant pool exists has added greater urgency to the development of a new national student recruitment program.

4. Dr. Haffner spoke about the need to rationalize and further develop the concept of residency programs in optometry. He also called for significant residency program expansion in a variety of clinical areas. He tied this expansion to the aforementioned proposed new federal manpower legislation largely to be underwritten by the Federal Government.

5. Dr. Haffner spoke about the crisis in graduate education occasioned by the sharp decline in the last decade in the number of young optometric graduates who have entered, and who are entering, into programs of study leading to the Ph.D. in vision science in physiological optics. He cited the fact that the current overwhelming majority of such graduate students studying for Ph.D. degrees at the six institutions of optometry that offer such programs are non-optometrists and primarily foreign students. Dr. Haffner called upon the ASCO/AOA leadership to develop new financial resources to attract young graduates of the schools and colleges of optometry to enter graduate programs leading to Ph.D. study.

6. Finally, Dr. Haffner reiterated his call for the development of a national study of optometric education and optometric practice in the United States. The last such study, the Havighurst Study, was issued in 1971 and is the only public study ever done of optometric education. He cited the dramatic changes that have taken place in optometry since that study, including DPAs, TPAs and health care delivery.

Dr. Haffner concluded by saying that there was a rich and brilliant future for optometric education and optometric practice in the United States, but that these major crises facing optometric education needed to be realistically faced.

Discussing the agenda are, left to right, Dr. Barry Barresi, Dr. Norman Haffner and Dr. Richard Hopping.

"Is Your Future in Sight?"

The new optometry video, "Is Your Future in Sight?" developed by ASCO's Council on Student Affairs is now available for ordering. The video was created for high school and college audiences, but is suitable for various community groups as well. The video is 14 minutes in length and describes the scope of optometric practice and career expectations as portrayed to a high school or college career guidance class. It comes in a binder which includes printed sheets of information designed to answer most additional questions that students are likely to ask about optometry and optometric education. The price for the entire package including video, binder and instructive sheets is $15.00. The video is available through the national ASCO office: 6110 Executive Blvd., Suite 514, Rockville, MD 20852.

Journal of Optometric Education Report

The *Journal of Optometric Education* continues under the leadership of editor David A. Heath, O.D., associate professor of optometry and director of general vision services at the New England College of Optometry and managing editor Patricia Coe O'Rourke, M.A.

Editorial

Four issues were produced during 1988-89 containing a total of seventeen reports.

One issue included papers on student remediation presented at the 1988 meeting of the American Academy of Optometry with sections on causes of academic difficulty, responsibilities of the students and the institution in remediation and designing clinical remediation programs. In addition, papers dealing with a variety of other topics were published: the recommendations of ASCO's Optometric Gerontology Curriculum Development Committee, the development of a DPA educational program, the accelerated O.D. program at the New England College of Optometry, a study of the degrees earned by deans in the health professions schools, and a profile of optometry in Hong Kong.

Other articles included instructional strategies for the optometric educator, a new approach for an assessment of clinical competency, teaching students how to manage strabismus, a vision training residency at SUNY, an evaluation of a core curriculum for optometric residents, postgraduate clinical training at the New England College of Optometry and a description of a spectacle calculations program.

Editorials published this year were: "Educational Research: Fact or Fantasy?" and "Postgraduate Clinical Education: At the Crossroads" by David A. Heath, O.D.; "The Challenge of Change," by George Collins, M.D.; and "Student Remediation" by Morris Applebaum, O.D.

A revised publication schedule was enacted this year to conform more closely with the academic year. Publication dates are: Fall—September 1, Winter—December 1, Spring—March 1 and Summer—June 1.

Distribution and Subscriptions

The total distribution of each issue is about 2800 copies with all senior optometry students receiving JOE directly in their mailboxes as a result of the support of ASCO's sustaining members.

Production and Advertising

Advertisers this year were Varilux Corporation, Ciba Vision Care, Starline Optical, and Volk Optical/Tech Optics. Special thanks to these sustaining members for their support.

OEA Awards

The Journal again has been honored with several awards in the Optometric Editors Association's annual journalism awards contest for the published year 1988. The Journal again won the first place award for "Best Journal-National." The Journal also was awarded first place in the "Best Guest Editorial-National," category for the editorial, "Optometry Can Help in the War Against AIDS." Second place in the "Best Editorial-National" category was received by ASCO editor David A. Heath, O.D., for "Educational Research: Fact or Fancy?" The Journal also was awarded first place in the "Best Non-Technical Article-National" category for "Optometric Education's Challenge: AIDS in the Curriculum" by Roger J. Wilson, O.D. Second place in the "Best Technical Article-National" category was won by Jack E. Terry, O.D., M.S., for "Deans in the Health Professions."

Ms. Patricia C. O'Rourke, managing editor of the Journal of Optometric Education, accepts the award for "Best Journal—National" from Optometric Editors Association president, Dr. Jim Bosse.

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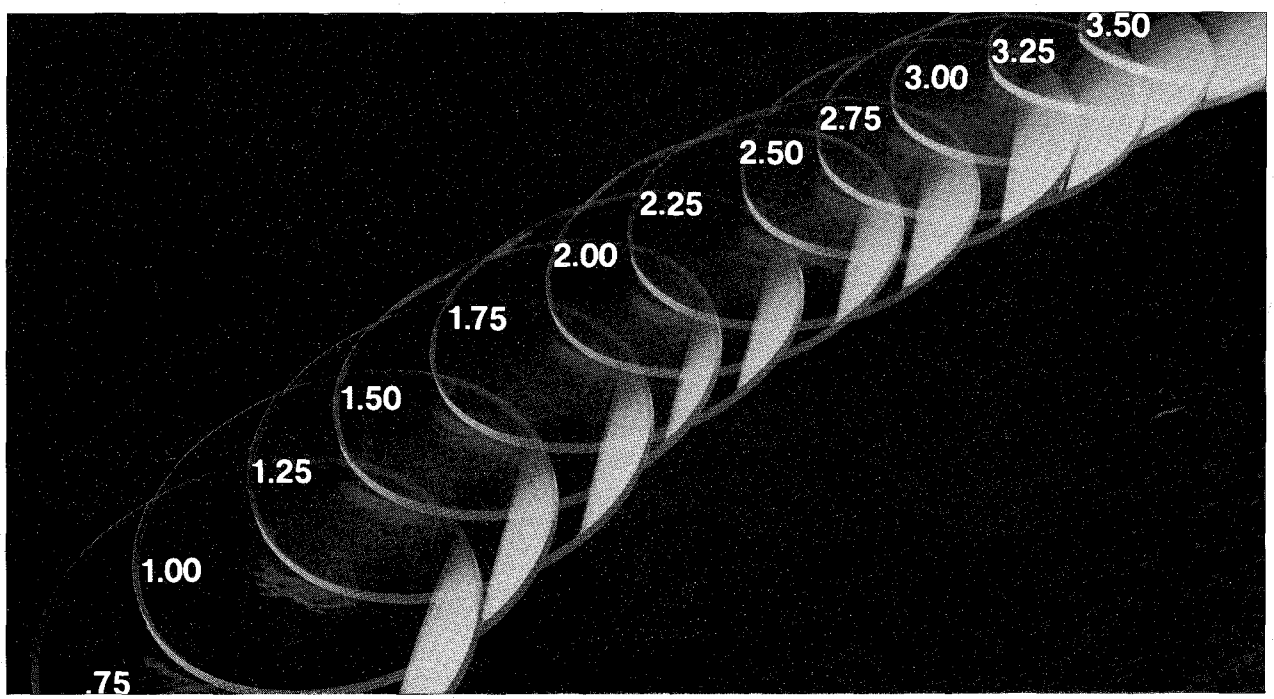

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